

1       1.    A system for voltage stabilization of a power supply line, the system comprising:  
2           an autotransformer comprising a series winding and a parallel winding;  
3           a variable inductance connected to the autotransformer, the variable inductance  
4           comprising;

5                a magnetic core, a main winding wound around a first axis, and a control  
6                winding wound around a second axis; and  
7                a control system for controlling the permeability of the magnetic core,  
8                wherein voltage variations in the power supply line are automatically compensated  
9                for,

10                wherein the first axis and the second axis are orthogonal axes, and  
11                wherein, when the main winding and the control winding are energized, orthogonal  
12                fluxes are generated in the magnetic core.

1       2.    The system according to claim 1, the control system further comprising:

2                a processor unit;  
3                a setpoint adjustment unit in electrical communication with the processor unit;  
4                a switch in electrical communication with the processor unit;  
5                a feedback input in electrical communication with both the processor unit and the  
6                power supply line; and

7                a rectifier circuit in electrical communication with both the processor unit and the  
8                control winding,

9                wherein the switch is operated to connect and disconnect regulation,  
10                wherein the feedback input senses an output voltage, and  
11                wherein the processor unit controls a control current supplied to the control  
12                winding.

1       3.    The system according to claim 1, wherein the series winding of the autotransformer  
2                is connected in series with a first power supply line, and

3                wherein the parallel winding is connected in series with both the main winding and  
4                a second power supply line.

1       4.    A system according to claim 1, wherein the series winding and the main winding are  
2                connected in series with a first power supply line,

3       wherein the main winding is located on a line side of the series winding, and  
4       wherein the parallel winding is directly connected to a second power supply line.

1       5.      The system according to claim 1, wherein the series winding and the main winding  
2       are connected in series with a first power supply line,

3       wherein the main winding is located on a load side of the series winding, and  
4       wherein the parallel winding is directly connected to a second power supply line.

1       6.      A three-phase system for voltage stabilization, comprising a system according to  
2       any of claim 2, 3, or 4 for voltage stabilization of each phase.

1       7.      A three-phase system according to claim 5, wherein control windings for three  
2       phases are connected in series and regulated together.

1       8.      A three-phase system according to claim 5, wherein control windings for the three  
2       phases are controlled independently of one another.

1       9.      The system according to claim 1 wherein the magnetic core comprises anisotropic  
2       material.

1       10.     The system according to claim 1 wherein the orthogonal fluxes are generated in  
2       substantially all of the magnetic core.

1       11.     A method of stabilizing a voltage, the method comprising the steps of:

2       supplying an input voltage to an autotransformer;

3       connecting a controllable inductance in series with at least one winding of the  
4       autotransformer;

5       sensing an output voltage;

6       generating orthogonal magnetic fields in a magnetic core of the controllable  
7       inductance; and

8       adjusting at least one of the orthogonal magnetic fields to control a permeability of  
9       the magnetic core to adjust the voltage in response to the output voltage sensed.

1       12.     The method of claim 11 wherein the controllable inductance is connected in series  
2       with a series winding in a first phase of a circuit.

1       13.     The method of claim 12 wherein the controllable inductance is connected to the load  
2       side of the series winding

1       14. The method of claim 11 wherein the step of controlling a permeability further  
2       comprises, adjusting a control current supplied to a control winding of the controllable  
3       inductance.